

Why can a food chain have only 4 or 5
trophic levels? → feeding level

Laws of Thermodynamics

- Every ecosystem requires energy (sun)
Energy is not limitless
- The amount of energy available is based on 2 scientific principles called the Laws of Thermodynamics
- The first law states that energy can neither be created or destroyed, however it can change forms
- For example solar energy from the sun can change into chemical energy by the process of photosynthesis

- The second law states that during any change in forms, some energy is lost in the form of heat and becomes unusable

- **So how does this affect an ecosystem?**

- It means that there is less energy available as you travel up a food chain

- This limits the number of trophic levels to a maximum of 4 or 5 in any food chain

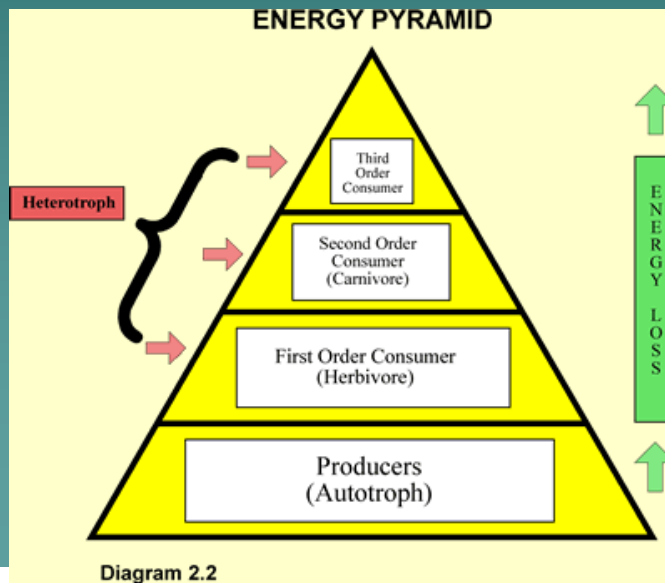
- For example at each feeding level energy is lost as heat as that organism digests, reproduces, breathes etc.

- Energy is also tied up in the organism as unedible parts such as bones and skin

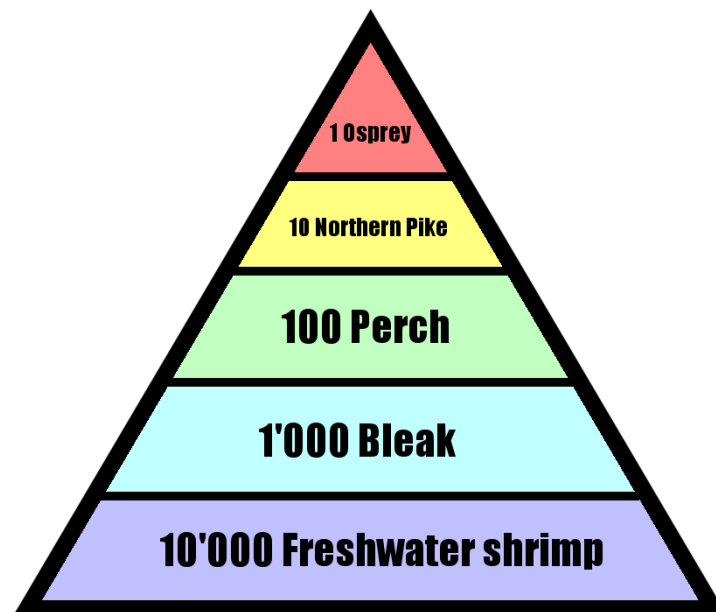
Energy Pyramids

3 types

1) Pyramid of Energy – shows the amount of energy at each trophic level



2) Pyramid of Numbers – shows the number of organisms at each trophic level



• 3) Pyramid of Biomass – shows the amount of dry tissue (after removing the water content of the organism) available at each trophic level

↓
after water
has been removed

